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PATENT & TRADEMARK OFFICE

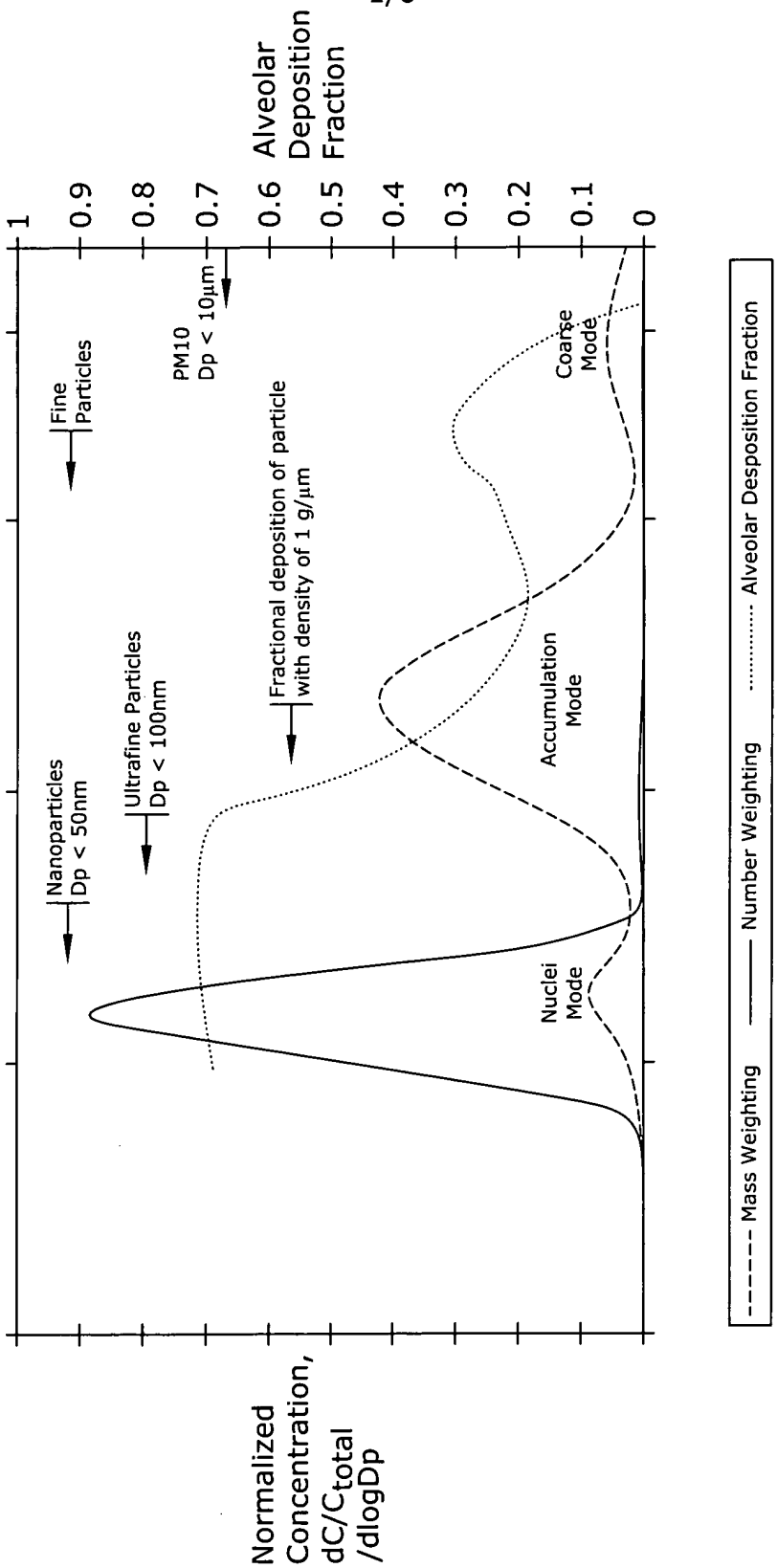


Figure 1

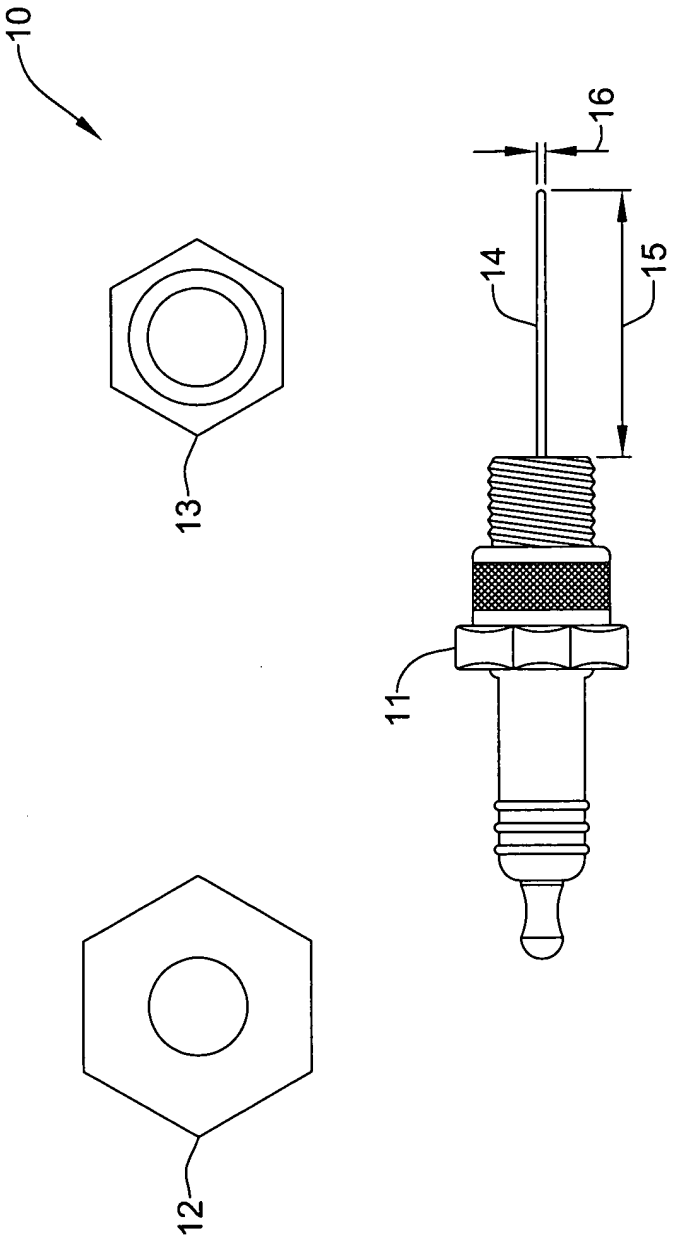


Figure 2

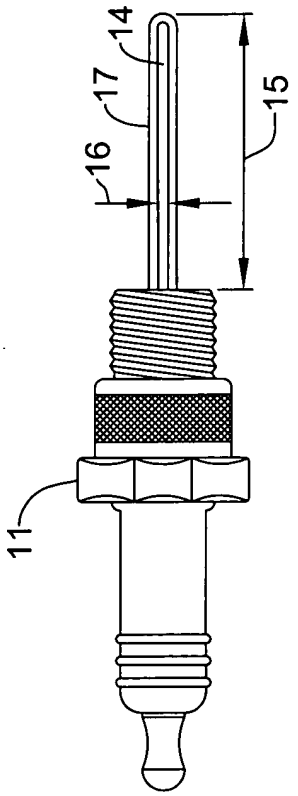
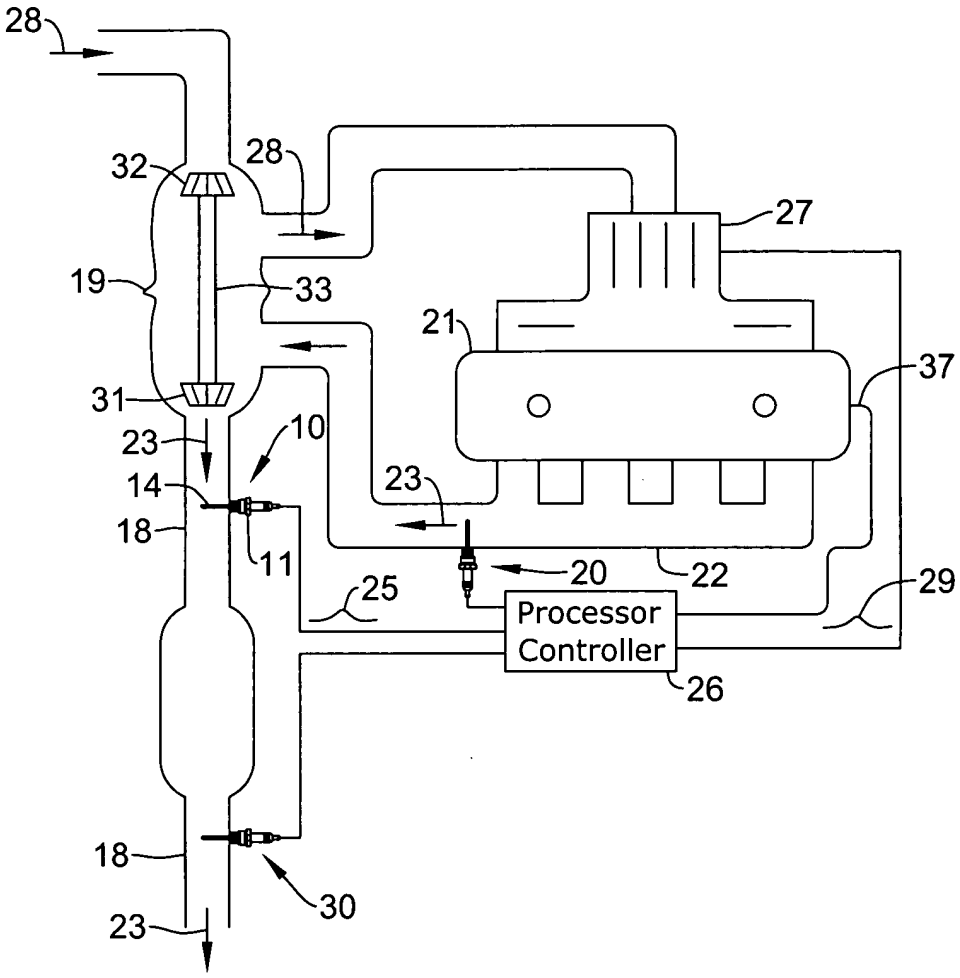


Figure 3


28
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29
Processor
Controller
26
18
30
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Figure 4

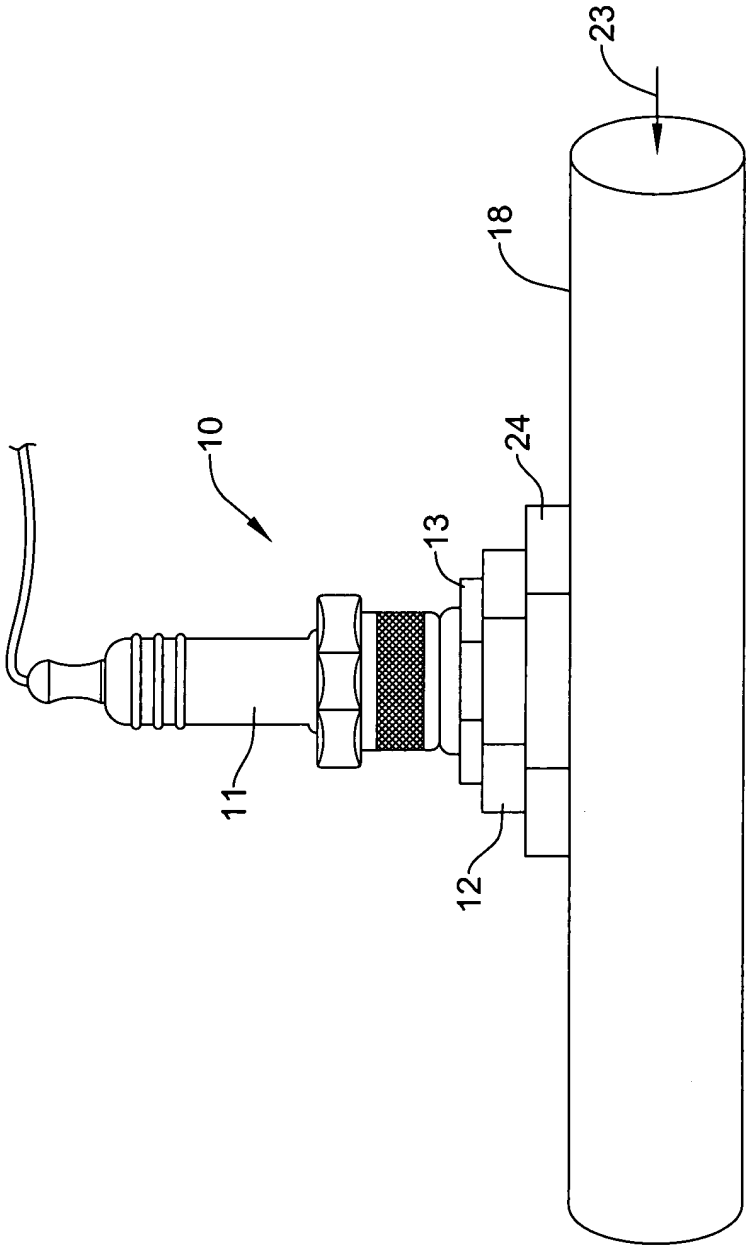

Figure 5

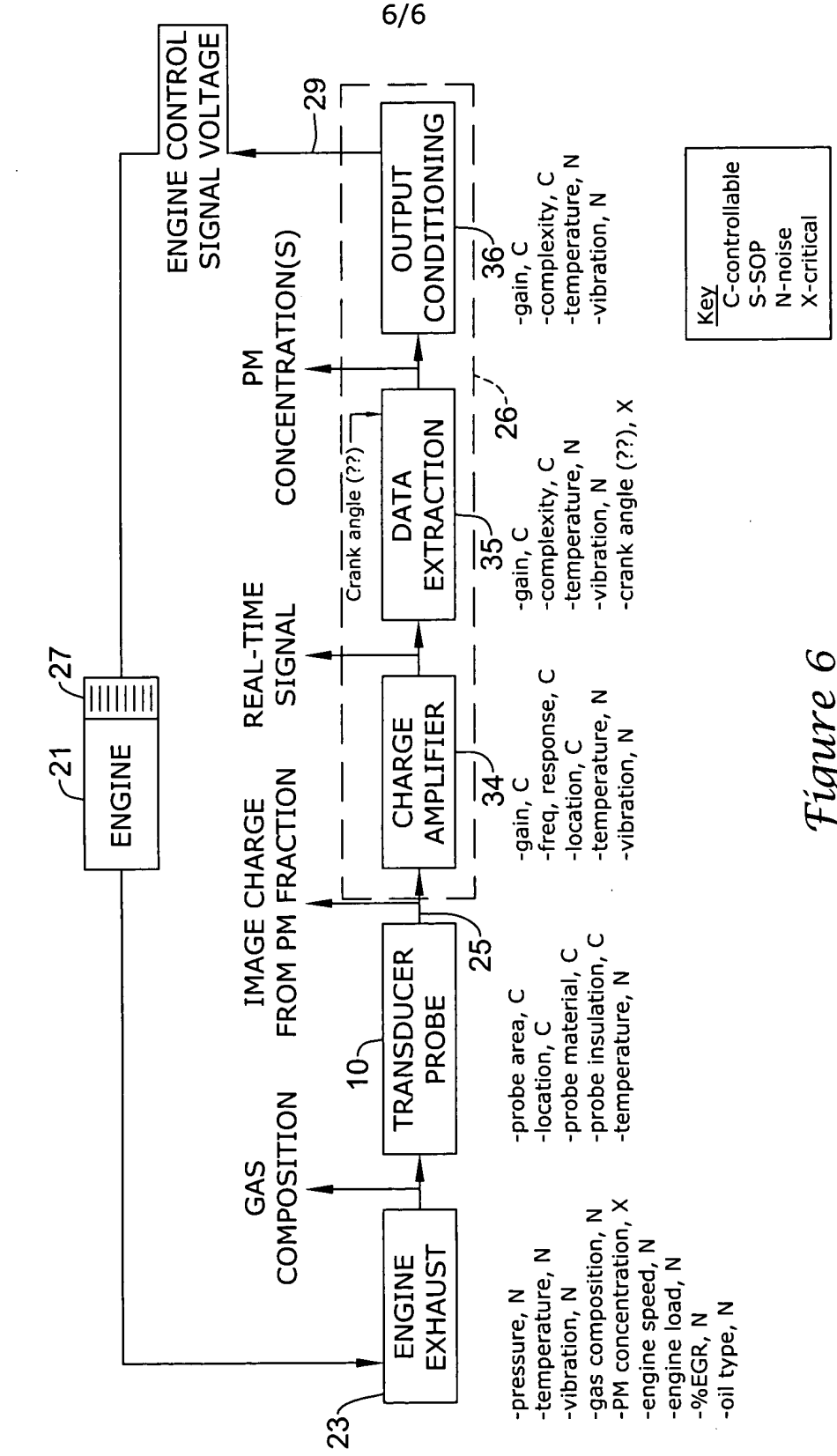
ENGINE CONTROL SIGNAL VOLTAGE
29
ENGINE
21
27
ENGINE EXHAUST
23
TRANSDUCER PROBE
10
CHARGE AMPLIFIER
DATA EXTRACTION
OUTPUT CONDITIONING
GAS COMPOSITION
IMAGE CHARGE FROM PM FRACTION
REAL-TIME SIGNAL
PM CONCENTRATION(S)
Crank angle (??)
25
34
35
26
36
-pressure, N
-temperature, N
-vibration, N
-gas composition, N
-PM concentration, X
-engine speed, N
-engine load, N
-%EGR, N
-oil type, N
-probe area, C
-location, C
-probe material, C
-probe insulation, C
-temperature, N
-gain, C
-freq, response, C
-location, C
-temperature, N
-vibration, N
-gain, C
-complexity, C
-temperature, N
-vibration, N
-crank angle (??), X
-gain, C
-complexity, C
-temperature, N
-vibration, N
Key
C-controllable
S-SOP
N-noise
X-critical

Figure 6